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Creating a Historical International Standard Classification of Occupations

An Exercise in Multinational Interdisciplinary Cooperation

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Abstract. This major international history project succeeded because of the goodwill, commitment, and collaborative endeavor of a team of researchers drawn not only from different countries but also from different disciplines. Its immediate product is a recently published book, *HISCO: Historical International Standard Classification of Occupations* (van Leeuwen, Maas, and Miles 2002). The authors describe the substantive issues, methodological questions, and practical arrangements behind the HISCO scheme, which is a classification tool designed to enable researchers working with historical occupational titles in a variety of linguistic and geographical contexts to communicate with each other and to make international comparisons across the nineteenth and twentieth centuries in social, economic, and other fields of history. HISCO is rooted in the 1968 version of the International Labour Organisation [then known as Office]'s International Standard Classification of Occupations (ISCO68) (ILO 1969). This means that in addition to comparing historical information across national boundaries, we can establish linkages between historical and contemporary data sets. The authors also note some recent developments on the application of HISCO in historical research.

Keywords: historical occupational titles, history of work, occupational coding and classification, social history, social mobility

HISCO emerged from a specific research problem: how should one study historical patterns of social mobility internationally? This question was the concern of the Historical International Social Mobility Analysis (HISMA) project, which was designed to test the conclusions of the CASMIN project in sociology.¹ However, when we began to discuss how to organize national mobility data to make comparisons between countries, it became evident that there was no clear way to proceed. As in many other fields of economic and social research, our

research was based on the occupational titles, descriptions, and declarations found in various census and civil registration documents. Therefore, we needed a scheme that would allow us to “code” such occupational information cross-nationally into a common classification scheme.

Comparative research on the history of work is severely hampered by confusion regarding occupational terminology across time and space, within as well as between languages. This situation is regrettable, because occupation is a key variable in many fields of history, ranging from stratification through demography to studies of labor markets and production. Within these fields, it is often desirable, and sometimes essential, to make comparisons between regions and periods.

The problems caused by the difficulties of interpretation have been particularly evident in the field of social mobility, where social position as indicated by occupation is a crucial issue. Indeed, historians frequently note that observed differences between tables of occupational mobility may very well be due to incompatibility between coding schemes, or to classification errors (Kaelble 1985, 7–8). Even when dealing with contemporary survey material in the social sciences, where the problem is arguably less severe, researchers have often voiced the same doubts about the validity of international comparisons. John H. Goldthorpe (1985, 554), for example, has noted the following in many contemporary studies on social mobility:

[T]here is invariably a passage in which methodological problems and, in particular, problems of comparability of cross-national data are discussed and acknowledged to be grave. But then, this ritual having been completed, the analysis

of the data goes ahead, even with a variety of *caveats*. The possibility that seems not to be contemplated, however, is that the degree of unreliability in the data is such that analyses should simply *not* be undertaken; that rather than such analyses being of some value as “preliminary studies,” which may subsequently be improved upon, they are in fact no more likely to have some approximate validity than they are to give results that point entirely in the wrong direction.

It seemed clear to us, then, that comparisons of important historical structures and processes would be far less problematic if we achieved comparability in the coding of occupations. The construction of such an occupational classification system proved, however, to be a project within a project, taking on a life of its own and leaving us with no spare time or energy to engage with mobility *per se*. As a consequence, we decided to broaden the scope of the HISCO scheme beyond that required for HISMA so that we could apply it to a wider spectrum of social and economic topics based on occupational data.

Choosing ISCO68 as the Starting Point

A defining moment in the early development of the HISCO scheme was the decision not to start from scratch but to historicize a system with proven comparative credentials: namely, the ILO's ISCO. With some exaggeration, one might say that our biggest innovation was to innovate as little as possible. The ILO (1969, iii) has developed ISCO to do the following:

[ISCO will] provide a systematic basis for presentation of occupational data relating to different countries in order to facilitate international comparisons. A second objective, related to the first, is to provide an international standard classification system which countries might use in developing their national occupational classifications.

It is worth noting that the second objective has indeed been achieved in many countries, thus bringing into existence national thesauri of occupational titles with national codes linked to ISCO.

The ILO has produced three versions of ISCO, in 1958, 1968, and 1988. For several reasons, we decided to root HISCO in the 1968 version of ISCO (ISCO68). First, this version contains a larger number of occupations than the 1958 version but still includes many historical ones, unlike the 1988 version. Second, the existence of both official and unofficial versions of the 1968 manual in several languages further facilitates the task at hand. Third, ISCO68 already had a track record in historical application. Donald Treiman (1976, 1977) produced an amended version of ISCO68, which has proved useful in coding historical occupations. Furthermore, “recode” jobs have been developed to translate the Treiman version of ISCO68 into other international stratification schemes (Ganzeboom, de Graaf, and Treiman 1992; Ganzeboom, Luijkx, and Treiman 1989). The best prospects for HISCO thus seemed to originate with ISCO68.

In ISCO68, some 1,506 different occupational categories are distinguished and described. These subsume the 6,000 occupational titles indexed in the ISCO68 manual. Each of the 1,506 categories has been given a unique five-digit code, allowing easy amalgamation into broader categories. The first three digits refer to unit groups, of which there are 284; the first two digits refer to minor groups, of which there are 83; and the first digit refers to major groups, of which there are 8. The amalgamation principle of the 8 major groups appears to be one of economic sector, representing “broad fields of work” (ILO 1969, 3), as commonly found in economic classifications of contemporary or historical labor forces in censuses. As an example, codes 6-xx.xx refer to the primary sector of the economy, with codes 6-2x.xx identifying various types of agricultural and animal husbandry workers. This last group includes, among others, codes 6-22.xx for field crop and vegetable farm workers, which in turn relate to several more specific occupational categories: general field crop farm worker (6-22.10), vegetable farm worker (6-22.20), wheat farm worker (6-22.30), cotton farm worker (6-22.40), rice farm worker (6-22.50), and sugarcane farm worker (6-22.60).

The fact that ISCO lends itself to a simple regrouping into the eight economic sectors formed by the major groups may be of little use to social historians and historical sociologists striving to create, for example, a social class scheme, but it need not be a point of concern either. They may very well disregard the option to regroup along the economic lines of the major groups, as long as codes allow them to regroup along the particular social or economic lines they prefer. HISCO, we think, allows them to do so. The finest level of coding in HISCO (with descriptions of occupational activities each given a unique code) is, as the aforementioned example demonstrates, on a very detailed level. Invariably, of course, some information is lost when it is coded, but in a sense that is precisely what the coding process is about: reduction of data to produce order and context out of a bewildering reality.

Given the nature of the problems involved in generating a historically sensitive scheme, we subjected several preexisting frameworks to detailed scrutiny before we chose ISCO68 as the framework for HISCO. This decision seems to have been vindicated by the fact that, in the wake of the coding exercises carried out to fit historical titles into the scheme, most of its basic structure remained intact. Indeed, HISCO follows almost the same structure as ISCO68 with regard to major, minor, and unit groups. It differs in the customization of content to suit the historical record and in the addition of subsidiary variables to minimize the loss of significant information.

In particular, the terms and descriptions entered as occupational descriptions in historical censuses and registration documents sometimes contain information that is not strictly about work activity and therefore cannot be accommodated within the original ISCO68 framework. Some of this infor-

mation might, nevertheless, be useful to those seeking to use an occupational classification scheme for the purposes of a wider social and economic analysis. In part, this additional information stems from a broader understanding of what constituted an occupation in the past, but it is also, in some cases, a product of historical documents themselves. In such cases, a record of “rank or occupation” rather than a simple job description was requested. Accordingly, the most common form of supplementary material found in the historical occupational titles used to create the HISCO manual is information about various kinds of status. A status model is certainly implicit in the major and minor group structure of the ISCO68 framework, which starts with professionals at the top of the hierarchy and ends with laborers at the bottom. However, it recognizes neither employment status within manual employment nor, by definition, other nonoccupational dimensions of status that might further assist an investigator seeking to classify occupational information into social groups.

A second type of additional information sometimes given in lieu of a job description in historical documents concerns statements about the relationship between an individual and the formal labor market. Such information pertaining to family employment relationships or a person’s previous or future employment, for example, might be useful to those seeking to draw a more rounded picture of an economy.

The third and final type of data that cannot be fully stored by ISCO68 but that might be important for contextualization, at both the broader economic and the specific occupational levels, is information on the outcome or product of an occupational activity. For the most part, this is evident enough, particularly where goods are grown or made (major groups 6, 7, 8, and 9), but this is also the case if one accepts that the principal products of groups 1–5 are services of various kinds. However, there is one large group of service providers—the Sales Workers of group 4—whose activities are defined not only by their roles but also, in part at least, by the products in which they trade.²

In two of these three cases, entirely new subsidiary classifications, STATUS and RELATION, were developed to accommodate information in the historical record that otherwise would have to have been discarded. In the third case, a subsidiary classification for PRODUCT was modeled on the United Nations (1998) Central Product Classification (CPC) scheme.

Organizational Framework and Data

The HISCO project had no formal structure, no institutional base, and no secretariat. It was held together by the enthusiasm and perseverance of the individual coders, who brought their data and their expertise to meetings across Europe and North America and, in between times, kept in touch by e-mail. During the meetings, the coders discussed the meanings of occupational titles and the principles involved in classifying them. Between meetings, individual

researchers undertook coding exercises, in which they attempted to fit the occupational titles found in the sources they were using into the emerging HISCO scheme. By means of a careful, iterative process of trial, error, and review, the coders eventually established a set of coding principles, enabling them to incorporate new or problematic terms into the evolving classification scheme.

Initial discussions led to the preparation of a position paper introducing the logic behind HISCO and some of the problems likely to be encountered with it (van Leeuwen and Maas 1997). Coders from England, the Netherlands, and Québec then tried to code the 100 most frequent male occupational titles in their historical data sets—with reports by Onno Boonstra (1997) and Ineke Maas (1997) on the Netherlands, Michel De Sève and Gerard Bouchard (1997) on Québec, and Andrew Miles (1997) on England. As a result of subsequent discussions, researchers developed a preliminary set of HISCO principles (Maas and van Leeuwen 1998) that they subsequently used to recode old titles and to code new titles. This resulted in HISCO codes for the 500 most frequent occupations in data sets in Belgium (by Koen Matthijs and others), England, France (by Jean-Pierre Péliissier, Danielle Rébaudo, and Dominique Nicolas), the Netherlands, and Sweden (by Sören Edvinsson and Johnny Karlsson), as reported in *HISMA Occasional Papers*, vol. 3, 1998. After further discussions, the coders again revised the principles, which began to reach maturity (van Leeuwen, Maas, and Miles 1999). This process led to codes for the 1,000 most frequent male occupations as well as the 1,000 (or fewer if there were no more in a data set) most frequent female occupations. We discussed the resulting codes, but we decided not to publish them because the creation of the present HISCO book was by then imminent. German and Norwegian coding results were, however, reported by Maas, Peter Böhnke, and Nanette Maske (1999) and by Marianne Erikstad (1999).

The 1,000 most frequent titles only represent a minority of all titles in a given country, but they nevertheless cover the great majority of all persons with an occupational title. In France, for example, the 1,000 most frequent occupational titles cover 96 percent of all grooms, whereas in Québec they cover 99 percent. Since the publication of the HISCO book, the process of coding data into HISCO has continued, with newly coded additional titles available on the Web (see the following discussion). In the case of France, for example, more than 9,000 unique occupational titles are now coded into HISCO, covering more than 99 percent of all persons in the French data set.

None of the titles coded into HISCO came from a database dedicated to this purpose. Half of the projects involved are general historical database projects, whose aim is to recover, “cleanse,” and archive data for use by other researchers. The others are projects with a specific research focus. These projects, and the data they have lent to the HISCO project, are summarized in table 1.

TABLE 1. Projects and Data Used to Create the HISCO Scheme

Country and project	Data	Coverage	Chronology
Belgium University of Leuven, Dept. of Sociology: Nuptiality project	16,956 marriage certificates	3 Flemish municipalities	1800–1913
Britain (men) Universities of Keele and Birmingham: Leverhulme literacy and ESRC social mobility projects	10,000 marriage certificates	10 English registration districts	1839–1914
Britain (women) The Data Archive, University of Essex: National Sample of the 1851 Census	415,000 person records	Great Britain	1851
Canada Institut Interuniversitaire de Recherches sur les Populations: BALSAC databank	665,000 civil certificates of births, marriages, and deaths	Saguenay region of Québec	1842–1971
France Institut National de la Recherche Agronomique/CNRS: TRA “3,000 families” survey	57,786 marriage certificates	France	1803–1945
Germany John Knodel: Village genealogies sample	17,011 family records based on parish and civil registers	6 German villages	1692–1950
Netherlands International Institute for Social History: Historical Sample of the Netherlands	15,348 individual records from birth, marriage, and death certificates	Province of Utrecht	1850–1940
Norway Norwegian Historical Data Centre, University of Tromsø: National population register	318,488 individual records	13 counties and 99 municipalities	1900
Sweden Demographic Data Base, Umeå University: Popum; the Sundsvall region	888,006 records from birth, marriage, death, migration, and catechetical registers	17 parishes	1803–1900

The occupational titles used in the construction of the coding scheme derive from population records of various types, which were collected by either churches or governments. Before c. 1800, records of births, marriages, and deaths kept by religious authorities at the parish level were the principal sources of such information. The nineteenth century was a particularly important period for the growth of civil registration, as the emergence and development of the modern state was associated with increased and systematic collection of “vital” demographic statistics, both of life-cycle events and the taking of population censuses. By the same token, state management of record keeping sometimes led to limited access to certain types of information, which is one reason why religious documentation remains important to data collectors in this period.

Most prominent among the types of document used for the HISCO project were marriage certificates, which carry the professional descriptions of some or all of those involved in a wedding ceremony. Marriage registers comprise at least some of the data used in all countries, with the exception of Norway, where the titles come exclusively from a population census. In Belgium and France, however, the data are solely from marriage registers.

However, despite the unifying theme of marriage, the availability and range of data varied considerably across the

project. Historically, the most thorough data collectors seem to have been the Swedish, who, as a result, have access to full, consistent, and linkable records of birth and baptism, death and burial, marriage, migration, and other catechetical³ issues from the early eighteenth century. This position contrasts with that in Britain, where, apart from marriage records from the 1830s, such parish registers are only patchily available.

A second type of variation concerns the range of information available in a common source. In the case of the ubiquitous marriage certificate, the British were the coyest, in the vast majority of cases recording only the occupations of the groom, his father, and his father-in-law. A space was left for bride’s occupation, but this was rarely used. By contrast, in the Netherlands not only were the occupations of all the main protagonists recorded but so too were those of the people who officially witnessed the ceremony. In Belgium, multiple occupations were often recorded for each individual.

Of all the data sets used to construct the HISCO scheme, the widest chronological coverage is provided by the German sample, which begins in the later seventeenth century and ends in the middle of the twentieth century. The German data are the earliest in the project, but the Canadian data, which begin in 1842 and finish in 1971, reach furthest toward the present. Only the Swedish records are entirely

confined to the nineteenth century, but most of the occupational titles coded are from the nineteenth and early twentieth centuries. For example, the Belgian marriage certificates cover the period 1800–1913, the British 1839–1914, the Dutch 1850–1940, and the French 1803–1900, with a smaller collection from the period 1901–1945.

In terms of geography, most of the data are as much regional as national. The Canadian data, for example, come from the Saguenay area of Québec and are therefore also essentially French. The Dutch data come from the Historical Sample of the Netherlands, but only from that part of the sample covering the Province of Utrecht. Only two data sets can claim a more complete coverage: the French, which is based on the TRA national survey of families, and perhaps the British, in which the marriage certificate sample is taken from 10 registration districts from the Midlands, as well as the northwest and southeast of England, and is supplemented by information from the (national) British population census of 1851. Nevertheless, even when only part of a country was sampled, the sampling was often designed to reflect a broad range of economic activity. For example, the Swedish titles are taken from the Sundsvall region in the north of Sweden. The region comprises 17 parishes, which include not just agrarian communities but also the City of Sundsvall together with parishes influenced by rapid industrial development. In Belgium, three regions of Flanders were sampled: Leuven, characterized by traditional handicrafts and trade; Bierbeek, a typical rural area; and Aalst, notable for its industry.

Place and time are clearly the most important influences on the types of occupation sampled. However, the range of titles available is also affected by the sources at hand. The majority of grooms' occupational titles collected from marriage records refer to individuals in their midtwenties, who were therefore more likely to be working in some occupational sectors than others. Although this problem is, in theory, offset by the recording of fathers' occupations in the same documents, it is not always clear in what part of their career these positions were held. In contrast, those researchers who could link records from events across the life course were able to obtain a sample that more accurately reflected the complete division of labor. In the Canadian sample, for example, researchers obtained the occupations of grooms, grooms' fathers, and grooms' fathers-in-law at about 25 years of age, and then again at about 50 years of age, by linking individuals between marriage ceremonies. Similarly, the Historical Sample of the Netherlands, from which the Dutch data are taken, comprises occupational information from death certificates, as well as from birth and marriage records.

In addition, some types of frequently practiced occupations do not appear in the samples because they were deliberately obscured or simply excluded by the nature of the original sources. This exclusion applies to both male and female occupations but most particularly, perhaps, in the

latter case. Prostitutes, for example, are entirely absent from the sources.

The scarcity of women's occupational titles in the sources used by the country coders is a reflection not only of ideology but also of widespread reality in regard to the limited nature of women's work in the nineteenth century. Where women's occupations were recorded, the spectrum of titles was more restricted, which, as well as the more limited range of opportunities open to women, in some cases reflects how they were recorded. For example, in the Norwegian sample, most female titles are status terms, reflecting a woman's relationship to the male head of household; only widows are given occupations of their own. In the British case, in the absence of such information about women's work in the marriage certificates, researchers used the records of the 1851 census to identify occupations that were specifically carried out by women.

All the occupational information in the data sets had been coded in some way before it was reused for HISCO, usually according to in-house schemes. In most cases, this coding had been done in such a way that researchers could easily recover the "exact" titles. Standardization processes varied. In Belgium, they not only involved the removal of additional titles referring to exactly the same activity and the correction of spelling errors, but also a degree of language standardization in which a minority of titles originally written in Dutch were translated into French. The occupational titles from French Canada still contain some English-language titles. In France, researchers removed irrelevant information (such as the name of a military regiment); in the British census data, researchers achieved a similar result by limiting the length of the unique text strings.

Incorporating Historical Titles into ISCO68 to Create HISCO

The HISCO scheme emerged directly from the process of incorporating historical occupational titles into the modern ISCO68 scheme. Associated with this process was the emergence of coding principles or rules that the scheme builders used to adapt ISCO68 for the purpose of absorbing the idiosyncrasies of historical data. In this section, we describe the methodology behind the construction of the HISCO scheme.

Starting from the Occupational Titles Themselves

One of the first issues introduced by the experience of trying to code our own data into ISCO68 was the extent to which detailed knowledge of local context should influence our coding decisions. For example, when confronted with the term *weaver* in the context of a small English town in 1810, one can be fairly sure that the person undertaking this activity was not working at a machine in a factory, and so the code for "Cloth Weaver (hand)" would seem to be a reasonable choice.

Similarly, most fishermen in the nineteenth-century Dutch Province of Utrecht were probably inland rather than deep-sea fishermen and could therefore be coded accordingly. However, although such “modal” coding may be a logical approach for an individual researcher using a scheme for his or her own purposes, it is not an appropriate method for *scheme builders*, whose role is to facilitate the coding process for others by providing *all* possible or known coding options within the scheme’s geographical and temporal parameters. A scheme based on modality is subject to distortion, because in certain cases there may be diverging opinions about the precise nature of the activity associated with a particular title, and because the majority activity at one time or in one place could well be a minority activity at a later date or in a different setting. Researchers therefore decided that the first principle to be used when they were *coding for the purposes of establishing the scheme itself* was that this activity should proceed on the basis of the given occupational title alone.

One consequence of this approach is the creation of new codes within the existing framework, for example, to accommodate the fact that a person described as a “fisherman” could be either an inland or a deep-sea fisherman. Another consequence is that a historical title might refer to a number of activities located in different major or minor groups. In this case, the researchers gave the title two or more codes. The outcome of this process is that users are provided with an appropriate number of coding options for a particular occupation, and they then have to decide for themselves which to choose in a given historical and geographical context.

Principle 1. As scheme builders, we were concerned with all possible meanings of a given occupational title, rather than the most likely meaning in a particular time or place. If more than one possible meaning existed, we identified a number of alternative coding options.

The Problem of Vague Historical Occupational Titles

Two problems occur in nearly all historical data sets: occupational titles are either too laconic—thus allowing for the possibility that more than one code might be applicable—or they are too specific and contain information that is lost during the coding process. In this section, we describe how we handled and incorporated unspecific titles.

The normal solution to the problem of very general titles was to create new general codes. This principle can be put into practice in three ways. First, one can use codes ending in .05 or .10 (which are often not used in ISCO68). Second, one can use codes ending with .00 or even 0.00. Third, one can generate “in-between” codes, with endings such as .25 or .37. ISCO68 itself often—but not invariably—reserves codes x-xx.10 and x-xx.05 for so-called general occupations. Those are occupations in which an individual actually combines a number of tasks. An example is the “General Baker” (7-76.10), who does not specialize in baking bread

(7-76.20), or pastry (7-76.30), or confectionery (7-76.60), but who bakes all those products. Another example is the “General Machine-Tool Operator” (8-34.10), who operates various types of machines without specializing in, say, the operation of a milling machine (8-34.30).

Principle 2. If a title was general because the occupational activity itself was general (i.e., combines a number of tasks), we used or created x-xx.10 and x-xx.05 codes at the beginning of the relevant unit groups.

The aforementioned type of unspecific or general occupation clearly differs from another type, of which weavers are an example. The title “Weaver” is too general for ISCO68. The weaver might weave by hand (7-54.30) or by machine (7-54.40), weave lace (7-54.50) or carpet (7-54.55 or 7-54.60), and so on. However, he or she does not weave both by hand and by machine while making all the several products (nets and tapestry as well as carpet and lace) listed in minor group 7-54. Similarly, a “University Professor” might teach Physical Sciences (1-31.20), Engineering and Architecture (1-31.25), Life and Medical Sciences (1-31.30), and so on. All occupations in unit group 1-31 “University and Higher Education Teachers” are possible (although it is clear that no university professor teaches all those subjects, so again we cannot use principle 2). In those cases, it is not the occupational activity itself that is general; that is, a combination of a number of different tasks. Rather, the title itself is too unspecific for us to decide which particular activity was involved. Our solution was therefore to take the appropriate unit group code and add .00 (which led to the new codes 7-54.00 and 1-31.00, respectively).

Sometimes job titles might even refer to all occupations within a minor group. For example, the term *teacher* could refer to someone teaching any subject at any level. In this case, we added 0.00 to the minor group code (leading to code 1-30.00).

Principle 3. If a title was so general that it might have referred to any occupation within a unit group, we created a code ending with .00. If the occupation might have referred to any occupation within a minor group, we created a code ending with 0.00.

A special case in the category of vague occupational titles concerns those in which the generality was to be found in the possibility that production was combined with retailing. Examples here are “Watchmakers” or “Pelt Dressers.” Those occupations certainly involved manufacturing goods, but they also might have involved, to a greater or lesser degree, selling them too. In such cases, we could not use principle 2, because producers and retailers are located in different major groups. However, we decided not to generate a new joint code for those titles but to treat them simply as producers.

Principle 4. If a title was general because the occupational activities included both production and retail, we coded only the production activity.

Principles 2, 3, and 4 were still insufficient to accommodate all dimensions of ambiguity. In the simplest remaining case, an occupational title might refer to either of two or three occupations within the same unit group, but not to the rest. An example is “Hairdresser,” which can be a “Women’s Hairdresser” (5-70.20) or a “Barber-Hairdresser” (5-70.30), but not a “Beautician” (5-70.40), a “Manicurist” (5-70.50), or a “Make-up Man” (5-70.60). In this case, we made a new code that is in between those for the two types of hairdressers: code 5-70.25, “Women’s or Men’s Hairdresser.” Of course, when there were more than just two codes to choose from, we then chose a code between the first and second options.

Principle 5. If a title was so general that it might have referred to a small number of occupations within a unit group, we used a new code in between the codes for the relevant occupations.

A final category under the heading of vagueness concerns unspecific occupational titles that might refer to two or more occupations in different unit, minor, or even major groups. This might be the case if the material used in the production process is unclear. For example, a “Turner” may work with metal (8-33.20), stone (8-20.50), or wood (8-12.30). As already explained, all possible codes are ordinarily listed in such cases. However, when titles were so vague that they might have referred to a large number of occupations—for example, “Finisher”—or when the task associated with a particular term may simply have been unknown (perhaps as a result of spelling errors), the titles were given the code 9-99.99.

Principle 6. If an occupational title referred to a multitude of possible occupations, or if the meaning of the title was entirely unclear, we created the code 9-99.99 to accommodate it.

The Problem of Occupational Titles That Are Too Specific

If a historical occupational title was too specific, it could of course be given a more general code, but only at the expense of a loss of information. Sometimes an occupational title contained information on employment status, such as “master” plumber, “apprentice” carpenter, and potter’s “helper.” Usually, ISCO68 does not have separate codes that can accommodate this type of information, so we developed the subsidiary classification STATUS in which it can be stored.⁴

Given the nature of the documents in which they are found, it is not surprising that historical occupational titles sometimes indicated other dimensions of status, such as those connected with social position or educational qualifications. They too have been incorporated into the value system of the STATUS variable. In principle, it is of course possible for different dimensions to overlap—thereby rendering two codes necessary—but in practice it is very rare for more than one type of status to be declared.

If an occupational title *only* contained information on status, then we coded this status on the variable STATUS and the HISCO code became -1.

Principle 7. If an occupational title contains information on both an economic activity and employment (or other types of) status, then we coded the occupational information as normal, at the same time storing the status information in the subsidiary classification variable STATUS.

The STATUS scheme is delineated as follows:

OWNERSHIP

- 11 Owner, proprietor
- 12 Leaseholder, sharecropper
- 13 Poor

ARTISAN CAREER

- 21 Master
- 22 Journeyman
- 23 Apprentice, learner
- 24 Artisan

PRINCIPALS AND SUBORDINATES

- 31 Principal
- 32 Worker
- 33 Subordinate
- 34 Serfs and slaves

TERTIARY EDUCATION

- 41 Student
- 42 Graduate

“PURE” STATUS

- 51 Nobility
- 52 Prestige titles

Sometimes occupational titles contain information on a product that is made, sold, or bought, but ISCO68 does not allow such facts to be indicated. This is a particular problem when “Working Proprietors” (principally, shopkeepers and merchants) are concerned. In such cases, coders decided to use the variable PRODUCT in addition to the occupational code. Having tested a number of schemes on which to base a HISCO product classification, coders decided to use the United Nations (1998) CPC scheme for this purpose. To overcome problems with specificity and generality, they did so at the two-digit level.

Principle 8. If an occupational title contained information on a product, made or traded, that is lost in ISCO68, we coded this information in the variable PRODUCT.

Having thus ensured that information on status and product in the historical sources listing occupations is not lost when it is coded in HISCO, we sometimes found residual information in these sources that historians value and that ISCO68 does not accommodate. We can code such infor-

mation in a further additional classification variable called **RELATION**, with values for family relationship, temporal information, information on voluntary or honorary activities, and on economic capacity.

An example of a title that falls within this category is “Farmer’s Wife.” In the context of a historical occupational scheme, such familial information might be important. Depending on the time and place under scrutiny, a researcher might know that this term not only denotes a marital status but also points to a specific set of activities undertaken by the woman in question. Sometimes an occupational title tells us that an occupation is not yet, or no longer, exercised. Some people define themselves as retired teachers, soldiers, doctors, and so on. Less frequently, a title points to the future. For example, someone might state that he or she “will inherit the farm.” In these cases, we code the (future or former) occupation as usual, and we code the additional temporal information in **RELATION**.⁵

It is possible that the occupational titles contain information *only* on the **RELATION** and not on the occupation (e.g., “retired” or “disabled”). In this case, we follow the same procedure as with **STATUS**: the occupational code becomes -1, and the additional information is coded into **RELATION**.

Principle 9. If an occupational title contains information on familial relationships, temporal issues, voluntary or honorary activities, or economic capacity, we can store this additional information in the variable **RELATION**.

The **RELATION** scheme is delineated as follows:

FAMILY RELATIONSHIP

- 11 Wife or widow
- 12 Son
- 13 Daughter
- 14 Other male relative
- 15 Other female relative

TEMPORAL RELATIONSHIP

- 21 Former or retired
- 22 Future

VOLUNTARY OR HONORARY RELATIONSHIP

- 31 Voluntary, honorary

INCAPACITATED

- 41 Physical or mental disability

HOUSEWORK

- 51 Homeworker

Coding Results and Quality Control

All coders faced the challenge of both how to place titles that were too general or too specific and how to approach the problem of missing occupations, multiple occupations,

and nonoccupations. Coders solved those problems by using the principles outlined herein. Table 2 summarizes the process of title absorption by country.

By individual data set, coders could directly code between 46 percent (Swedish women) and 76 percent (Canadian women) of all occupational titles into ISCO68 without using any HISCO rules. On average, over 60 percent of the data could be coded in this way, thereby indicating that it made sense to build HISCO from a basis in ISCO68. However, the figures also show that it was necessary to develop the additional coding rules that underpin HISCO. Without such rules, coders would have faced difficulties coding their occupational titles in one-half to one-quarter of all cases.

Coders solved approximately one-half of all coding problems by making new codes. No relationship exists either between coding problems and language or between coding problems and gender. New codes were, for example, more often developed for female French and male Belgian titles (for 30 percent and 29 percent of all titles, respectively) and less often for female Canadian titles (9 percent). On average, coders assigned multiple codes to 10 percent of all titles. Thus, users of the HISCO manual—if they are coding occupations from a more or less representative sample of the population—will have to choose from at least two coding options in approximately 1 in 10 cases. The codes -1, -2, and 9-99.99 are least useful for those who want to use the occupational classification. It is, therefore, encouraging to see that such codes did not have to be used very often. One exception here concerns Swedish women, a difficulty caused by the fact that there are many words in Swedish to describe a woman who works in the home for her own family.

At several stages during the development of HISCO, researchers carried out a quality-control procedure: a random sample of occupational titles from each of the data sets used to create HISCO was coded by both the participating researcher and an independent coder from the same country, and researchers used the degree of (dis)agreement to assess HISCO’s reliability.⁶ On completion of the scheme, researchers attempted to make a more stringent test of the validity of the coding process. As before, this involved a pair of coders in each country working independently, but on this occasion they tried to place a sample of 100 occupational titles from a *different* national data set into HISCO. In any event, it proved impossible to implement this procedure in all the participating countries. In practice, approaches differed, so that in Germany and Britain, for example, the second coder omitted the subsidiary classifications. Nevertheless, at the key level of the HISCO code itself, the degree of correspondence was in most cases impressively high (see table 3). This was true even for the exercise carried out on a second set of Flemish titles in Belgium, acquired after the completion of the project. In those instances in which the two coders disagreed, most of the variation would seem to be

TABLE 2. Summary of Coding Results, by Country and Gender

Country	Gender	% of the most frequent 1,000 titles ^a accommodated by:					Total <i>n</i>
		ISCO68	New codes	Multiple codes ^b	-1/-2 ^c	9-99.99 ^d	
Belgium	Men	55	29	14	1	1	1,088
	Women	59	24	11	5	1	235
Britain	Men	66	19	11	1	2	1,004
	Women	60	18	8	11	4	1,061
Canada	Men	66	18	8	2	6	1,059
	Women	76	9	3	1	11	160
France	Men	64	21	14	1	1	1,300
	Women	57	30	10	2	2	754
Germany	Men	65	23	5	4	3	1,051
	Women	61	27	5	6	1	154
Netherlands	Men	62	28	8	2	1	986
	Women	73	18	6	2	0	82
Norway	Men	67	23	5	4	0	1,003
	Women	69	14	7	10	0	250
Sweden	Men	60	24	10	6	0	1,076
	Women	46	22	10	21	1	218

^aIn those cases in which there were fewer than 1,000 women's occupational titles in a particular data set, these are all existing cases. In the case of the men, the total number of titles from each country is greater than 1,000 because some descriptions contained two occupational terms.

^bThese include combinations of ISCO68, new codes, -1 or -2, and 9-99.99.

^cThese are the codes given when there is no occupational information in a given title, or an explicit declaration has been made that the individual concerned does not work.

^dThis is the code given to titles for which the meaning is unknown, or which might refer to a multitude of activities. See principle 6 in the text.

accounted for by the fact that they had different types or levels of expertise about the national occupational context, so that, for example, knowledge about a particular locality or historical period might have come into play. In those instances in which different HISCO codes were given for the same title, the significance of the disagreement was in most cases negligible, with titles appearing somewhere in the same unit, minor, or major group. In only 2 to 3 percent of the cases did coders place titles in different major groups. In addition to the low "comparison-error" rate at this level, there was no consistent pattern to or clustering of coding disagreement by major, minor, or unit groups.

The researchers' principal concern in the quality-control exercise was to measure the HISCO scheme's effectiveness in terms of ease of use and consistency of coding outcomes (see table 3). Another pertinent issue for the scheme's usefulness, however, is the impact of coding disagreement in terms of the percentage of successfully coded *cases*. High rates of agreement on the coding of titles could mask a large magnitude of error if there was disagreement over the coding of titles with high frequencies. Actually, this proved not to be the case. Inconsistencies between coders tended to involve less frequent, usually more specific, titles. Frequent titles such as "labourer," "miner," "farmer," "servant," and "dress-maker," which in each data set account for a substantial

TABLE 3. Summary of Results from Quality-Control Exercise

Country and new data set	% of titles receiving same HISCO code from both coders
Belgium (French) Population register of Leuven, 1866–1880	95
Belgium (Flemish) Members of the Provincial Council of Antwerp, 1836–1921	87
Britain 1881 National Census	92
Canada 1901 Census of Québec City	78
Germany Police registration record of Munich, 1830–1910	67
Netherlands Historical Sample of the Netherlands: Rotterdam, 1852–1902	87
Norway 1875 National Census	93

proportion of the total cases, caused few if any difficulties. In Norway and Britain, for example, only 4.9 and 2.6 percent of all cases, respectively, were coded differently by the two coders. The percentage of cases miscoded is thus even lower than the percentage of titles at issue, at 7 and 8 percent, respectively.

HISCO in Print and on the Web

The core of the HISCO book comprises descriptions of tasks and duties for each occupational group defined by the coding scheme. It also shows the particular occupational titles from the historical records of the countries in our data sets that can be coded to these occupational groups. At the highest level, these descriptions are ordered by economic sector—the so-called major groups—which are further subdivided into minor groups. Below that level, clusters of similar occupational groups are organized into occupational unit groups, followed by the subsidiary classifications STATUS, RELATION, and PRODUCT, which also include coding examples by country and language.

The book's main and subsidiary coding sections are supplemented by an index of all the historical occupational titles contained therein. The index is ordered by language; for example, one can see the codes given by the Belgian, French, and Québec coders for a particular French occupational title. Usually, only one code exists for each title. However, sometimes a title from the historical record refers to two or more unit groups, either because the title is vague and we simply did not know which of several activities were undertaken by the person so described, or because the organization of work in the past was such that the bearer of the title could do each and all of several activities. In those cases, the index provides more than one code. An asterisk marks such titles in the main part of the book to let the reader know that the title may also refer to another activity and can consequently also be found elsewhere in the book. Coders can then consult the index accordingly. In the case of the occupational titles listed in the French-language section of the index, there is one further reason why the index may contain more than one code for a particular occupational title: because of different patterns of historical and cultural development, or different chronological spans of the data sets, the same title may refer to different activities in different countries. In this sense, apparent inconsistency is in fact a reflection of the HISCO scheme's sensitivity to context.

The HISCO book is finished, but the development of the project as well as the scheme itself continues to flourish on the Internet. A Web-based information system on the history of work has been built around HISCO, but it includes much more: detailed information on work-based tasks and duties taken from occupational dictionaries and similar sources; images of historical occupational groups and activities, such as those from Jost Amman and Hans Sachs (1568), Jan Luyken (1965), and Diderot and D'Alembert's

(1751–80) *Encyclopedia*—see also Charles C. Gillispie (1993); and work histories written by experts on particular occupations. The Web site is hosted by the International Institute for Social History in Amsterdam, with a service providing access to HISCO codes.⁷ The service will also provide basic information on the new data used, the persons and institutions involved in coding data to the scheme, and any relevant bibliographical material. Altogether, the Web project is designed as a long-term infrastructural service to national and international researchers, evolving in response to their suggestions and additions as the information system is used and appreciated. Future developments may include the addition of Geographic Information Systems (GIS) applications to assist the analysis of occupational geographies; software that stores detailed information by sector of the production process and links it to individual occupations in that sector; and packages linking titles to variables associated with the social ranking of occupations, such as literacy rates, tax data, and prestige scores.⁸

In Retrospect

The HISCO scheme has been developed to assist historians, economists, social scientists, and policy makers interested in long-term processes of economic and social change. In particular, HISCO has been designed to facilitate the international *comparison* of historical occupational information over time. In the process of its development, it has proved successful in accommodating data from several different national data sets spanning more than 200 years.

Looking back, we feel it is a small wonder that a HISCO was created at all, given the complexity of our task and the loose organizational framework forced upon us by a lack of core funding. Reflecting on the first point, it seems clear that the process of standardization by which diverse data from a range of countries were brought together to build one scheme was achieved only because we chose not to create a classification system from scratch. The decision to stay as close as possible to the ILO's ISCO68 scheme was crucial because it allowed us to take advantage of decades of work by statisticians from all over the world in interpreting and classifying occupational tasks. Essentially, three types of change were made to ISCO68: the creation of new codes for those instances in which ISCO68 either did not mention or could not accommodate historical occupational titles; the transfer of occupational unit groups between major groups, in those instances in which we thought this would add to the logic of the scheme for historical purposes; and the creation of new subsidiary classification variables to capture and store important nonoccupational information that would otherwise be lost.⁹ The development and historicization of ISCO68 was no small task, but without this starting point we probably would not have succeeded. That we were able to adapt the scheme for our purposes testifies to the flexible nature of the ISCO team's work.

The networklike organizational framework of the HISCO project had both merits and drawbacks. A major negative feature was the inordinate amount of coordination that was needed—via e-mail, conference sessions, and stand-alone meetings—to come to decisions, to make sure they were understood in the same way, implemented in the same way, and ready at the agreed date. Geographical and linguistic barriers, as well as differences between the way in which sociologists and historians think and work, had first to be experienced and then overcome, as did differences in style of presenting an argument between scholars of different cultural traditions. A second drawback was the lack of funds, which meant that as far as HISCO was concerned, we were all effectively part-time researchers: tasks had to be done alongside and usually after the work we were actually paid for, so HISCO was rarely a priority in people's schedules. Those factors certainly slowed us down, especially because we had no formal contract that would have helped us push the individual coders to comply with our time schedule, flexible as it was.

In contrast, dedicated scholars with a passion for occupational coding and research were attracted to the project, lured into what turned out to be a megaproject precisely because it was not the kind of formal, bureaucratized exercise to which they were accustomed. The making of HISCO remains one of the more enjoyable experiences we have had among our various scholarly activities. In the end, the participants felt compelled to continue their work because of a collective belief in the overall aim of the project, which was conducted in an atmosphere of conviviality and mutual trust. The long and often intense discussions created a common understanding of the problems of coding occupational titles worldwide and a sense that HISCO could solve them. Now it is time for us to stand back, thank the members of the HISCO team and the many others involved, and see if in turn the wider historical community can come to trust, use, and develop HISCO.

The first signs are promising. As well as the data sets in the manual—covering Belgium, Britain, Canada, France, Germany, the Netherlands, Norway, and Sweden—coders with data from Brazil, Colombia, Denmark, Finland, Greece, Iceland, Italy, Portugal, Spain, Switzerland, and the United States have coded or are coding their data into HISCO, thus increasing the number of titles covered by tens of thousands.¹⁰ In this respect, the Web site on the history of work not only makes titles already coded into HISCO available to scholars from any part of the globe but also gives them the opportunity to continue to extend HISCO's coverage. In addition, a number of articles and papers that used the coding scheme have already been written (Hayen 2003; Maas et al. 2004; Van de Putte and Miles 2004; Walhout and van Poppel 2003). The fact that HISCO-based measures of prestige and social class are now in development will give impetus to the work. In the meantime, we will continue to assist the coders by means of the Web site and in dedicated HISCO work-

shops, but we now hope to renew our focus on the starting point: historical social mobility in comparative perspective (for further development of the HISMA project, see van Leeuwen, Maas, Miles, and De Sève 1997; van Leeuwen, Maas, Miles, and Pélissier 2002; see also van Leeuwen, Maas, and Miles forthcoming).

NOTES

1. For an account of the Comparative Analysis of Social Mobility in Industrial Nations (CASMIN) project, see Robert Erikson and John H. Goldthorpe (1992).
2. The same can also be said of a smaller category of industrial proprietors, whose incumbents are coded to 2-11.10 in the HISCO scheme.
3. Catechetical registers were continuously updated registers of the population in parishes, containing the results of annual examinations of reading ability and comprehension as well as key demographic events. For a long time, they were also the main source in the process of national civil registration in Sweden.
4. We followed the example of Harry Ganzeboom, Paul M. de Graaf, and Donald Treiman (1992), as well as several historical databases.
5. For example, a "farmer's son" will be given the code for Farmer with an additional code 11 for RELATION. He will not be coded as Farmer's Assistant.
6. Robert M. Hauser (1982) and Bouchard (1996, 99–108) have addressed the question of anachronism arising when modern coding schemes are used for historical data (see also Hershberg et al. 1974). Both argue that, despite the existence of some spectacular and well-known examples of anachronism, the degree of distortion is relatively small and arguably of the same order of magnitude or less than arises when one is coding directly from historical sources into a scheme adopted by a single historian.
7. The present site (hisco.antenna.nl) will soon be moved to that of the International Institute of Social History (www.iisg.nl).
8. If you would like to contribute to this project by coding occupational data into HISCO, supplying images of occupations, descriptions of the nature of the work, and the like, please contact Marco van Leeuwen at the IISG (mle@iisg.nl).
9. All new and transferred codes are listed in Section 6 of the HISCO book. The only significant *structural* change made to the original ISCO scheme concerns the case of managers and supervisory workers. ISCO68 does in fact have a major group containing "Administrative and Managerial Workers," but this contains only some of those engaged in management and supervision tasks (e.g., clerical supervisors are in major group 3). Coders therefore decided to repatriate those whose *primary* task is to *organize and direct the activities of others* into an expanded major group 2, renamed "Administrative, Managerial, and Supervisory Workers."
10. For the Portuguese HISCO codes, see Nuno Luis Madureira (2001) and Madureira, Maria Antónia Almeida, and Rui Esperança (2001); for extra Swedish codes, see Hayen (2001); for the Spanish codes, see Juanjo Romero (2001); and for the Colombian codes, see Fernan (2001). As part of the North Atlantic Population Project (NAPP), data from the 1880 U.S., 1881 Great Britain, 1881 Canadian, and 1875 Norway censuses, together with some Icelandic census samples, are currently being coded by Lisa Dillon of the University of Montreal, Chad Ronnander of the University of Minnesota, and Matthew Woollard at the University of Essex. See also the History of Work Web site for a list of coding projects under "About this project," "Provenance," and "Coding Projects."

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